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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/468,206	12/20/1999	TAKESHI FUJITA	09743/019001	3356

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EXAMINER

GRAHAM, ANDREW R

ART UNIT	PAPER NUMBER
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2644

DATE MAILED: 10/08/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/468,206

Applicant(s)

FUJITA, TAKESHI

Examiner

Andrew Graham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

Specification

1. The disclosure is objected to because of the following minor informality:

- page 4, line 11: the phrase "the inclination characteristic" fails to distinctly convey what is intended to be understood from the phrase. It remains unclear to what part or type of the relationship between the sound pressure level and frequency that the use of such claim language is referring. The remarks included with the submitted amendment A cite "a relationship" and a couple of characteristic curves, but not what part of the relationship is considered an "incline characteristic".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. **Claims 7-10** are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The speakers used in the system to obtain a "maximum inclination characteristic in a

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relationship between the sound frequency of about 500 Hz and greater and the sound pressure" are critical or essential to the practice of the invention, but not included in the claim(s) are not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). The relationship between the sound pressure and output frequency of a speaker - without filtering - is a property of the speaker used in the system as well as the orientation of the speaker in regards to other speakers. The speaker properties, such as the dimensions and materials, used to obtain such a relationship need to be disclosed in order for a particular property of such a relationship to be included as part of a claim limitation.

Claims 7 and 9 are rejected for including such a non-enabled limitation, and **Claims 8 and 10** are rejected due to their respective dependencies upon these claims.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. **Claims 7-10** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The phrase "maximum incline characteristic" in **Claims 7 and 9** is rejected as being vague and indefinite, as is detailed above in regards to the use of the phrase in the specification. In particular,

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it is not clear what property or aspect of the relationship can be referred to as the "maximum".

Claims 8 and 10 are rejected due to their respective dependencies upon these claims.

Claims 7 and 9 are also rejected for reciting the limitation "the adjacent two speakers" in the second line of the claims. There is insufficient antecedent basis for this limitation in the claim.

Claims 8 and 10 are again rejected due to their respective dependencies upon these claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 1, 2, 6, and 11** are rejected under 35 U.S.C. 103(a) as being unpatentable over Glassco (USPN 4673057) in view of Davis (USPN 4503553).

Glassco discloses a plurality of geometrical transducer arrangements. Glassco specifically discloses that the speaker systems are omnidirectional, which reads on "A loudspeaker having wide - directional characteristics" (col. 2, lines 48-66). One of the shapes

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disclosed is a dodecahedron with a specific angle between each of the twelve speakers in the system (col. 5, lines 36-46). This reads on "a loudspeaker body having a polyhedron shape". The speakers in the systems are particularly disclosed as being abutted and integrally mounted with each other and arranged at a common angle of divergence (col. 5, lines 20-36). This reads on "a plurality of speakers disposed on outer peripheral surfaces of the loudspeaker body in a manner that axial lines of adjacent two speakers intersect each other at a predetermined angle".

While Glassco teaches a number of physical variations of the loudspeaker system, any relative signal processing is not disclosed. Glassco does not particularly specify:

- a correction filter operatively connected to the speakers and increasing sound pressures in relation to increasing sound frequencies to flatten the sound pressures at apex positions of the adjacent two speakers

Davis discloses a signal processing system with many audio and operational benefits. One of these benefits is circuitry for obtaining a flat frequency response in the on-axis as well as off-axis directions (col. 8, lines 29-68). The flat response is obtained by adjusting the amplitude and phase of each output signal based as a function of frequency (col. 8, lines 57-68). The circuitry that performs these adjustments reads on "a correction filter operatively connected to the speakers and increasing sound pressures in relation

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to increasing sound frequencies to flatten the sound pressures at apex positions of the adjacent two speakers".

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to include the signal and speaker driving circuitry of Davis in the audio system of Glassco. The motivation behind such a modification would have been that, as taught by Davis, such circuitry would have flattened or evened the output frequency pattern in the on-axis as well as off-axis orientations, thus ensuring that the speaker arrangements of Glassco would have truly provided omnidirectional sound.

Regarding **Claim 2**, the polyhedron speaker shapes are specifically disclosed by Glassco as having equal orientations (col. 5, lines 36-46). This reads on "said loudspeaker body has a regular polyhedron shape having a plurality of outer surfaces on which said speakers are arranged respectively".

Regarding **Claim 6**, please refer to the like teachings of Claim 1, noting the particularly round embodiment shown in Figure 6 and the teaching of the device having a polyhedral shape (col. 5, lines 28-52).

Regarding **Claim 11**, please refer to the like teachings of Claim 1 regarding the "loudspeaker body" and "plurality of speakers" included in the system. Regarding the "correction value according to an attenuation factor", the frequency response pattern is taught by Davis as being adjustable based on the phase and amplitude of the signal driven by the speakers in the system (col. 8, lines 57-68). Davis

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specifically mentions that the variously angled speakers may be adjusted to emit a substantially round, uniform output pattern, enabling the areas between the on-axis regions of the speakers to obtain frequencies of the output signal where the particular frequency ranges would otherwise be attenuated. This flattening or evening of the sound field reads on "setting a correction value according to an attenuation factor based upon the predetermined angle to flatten sound pressures".

5. **Claims 3, 4, 5, 12, and 13** are rejected under 35 U.S.C. 103(a) as being unpatentable over Glassco in view of Davis, as applied above, and further view of well known prior art (MPEP 2144.03).

As detailed above, Glassco discloses a number of polygon shaped speaker systems, including a dodecahedron, and Davis discloses processing circuitry for ensuring an even frequency response for the entire range of frequencies emitted by a speaker system.

Regarding **Claim 3**, the details of a dodecahedron shaped speaker system are discussed in regards to Claim 1.

As per the specifics of the speaker connections though, Glassco in view of Davis does not specify:

- that the speakers are separated into three sets, wherein one of the speaker groups includes four speakers connected in series.

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However, Examiner takes Official Notice that the nature of the electrical connections and the properties of elements connected in series and in parallel would have made the connection of the speakers in variously sized groups an obvious and desirable modification. Connecting a group of resistances, which in regards to the current system, said resistances would be the resistances of the speakers, the most simple arrangement and the one with the fewest number of connections would have been the connection of each of the resistances in series. From the basic electrical laws though, resistances in parallel have a lower combined overall resistance than resistances in series (series = $R_1 + R_2$, but parallel = $(R_1 * R_2) / (R_1 + R_2)$), and thus draw less overall current and require less operating power from the same voltage supply (noting that $\text{current}_{\text{total}} = \text{voltage} / \text{resistance}_{\text{total}}$). Thus, in optimizing the system for simplicity as well as efficiency, the electrical properties of a preferred embodiment would have consisted of groups of speakers in series instead of all of the speakers in series. To promote uniform operation of the speakers - especially in a system attempting to create flat, balanced sound pressured, the groups would have needed to comprise an equal number of speakers. With twelve speakers then, this would have left the option of having six groups of two speakers, four groups of three speakers, three groups of four speakers, two groups of six speakers, and twelve groups each with one speaker, noting again that group here is defined as a set of speakers in series. Thus, the third of the possible groups listed above reads on "three sets of speaker groups connected

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in parallel to each other, one of three sets of speaker groups including four speakers connected in series.

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to connect the speakers in the system of Glassco in view of Davis in three groups with one of the groups comprising four speakers in series. As detailed above, the motivation behind such a modification would have been the improved tradeoffs between the simplicity of such a connection and the decrease in the amount of current passing through the speaker resistance and overall required by the system.

Regarding **Claim 4**, please refer to the like teachings of Claim 3.

Regarding **Claim 5**, the phase and amplitude control networks for modifying the radiation dispersion patterns are shown in Figures 15A-15C, and as can be seen, each include a plurality of capacitors, resistor, and inductors (col. 10, lines 18-68 and col. 11, lines 1-58). This reads on "said correction filter includes at least two resistors and two capacitors which are operatively connected.

Regarding **Claim 12**, please refer to the like teachings of Claim 3. Regarding **Claim 13**, please refer to the like teachings of Claim 4.

6. **Claims 7-10** are rejected under 35 U.S.C. 103(a) as being unpatentable over Glassco in view of Davis as applied above, and further in view of Kito et al (USPN 4146756). Hereafter, "Kito et al" will simply be referred to as "Kito".

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As detailed above, Glassco discloses a number of polygon shaped speaker systems, including a dodecahedron, and Davis discloses processing circuitry for ensuring an even frequency response for the entire range of frequencies emitted by a speaker system.

Glassco in view of Davis does not specify:

- that the sound pressure is increased according to a distance from the apex positions of the adjacent two speakers having a maximum inclination characteristic in a relationship between the sound frequency of about 500Hz and greater and the sound pressure, without the correction filter

Kito discloses a loudspeaker with an improved output frequency range. The output frequency range is broadened through the raising of the high band resonance frequency of the speaker by using a diaphragm shaped in a particular manner (col. 5, lines 27-39). The resulting relationship between the output sound pressure levels and the output frequencies is shown in Figure 4. As can be seen, the relationship curve reaches a maximum in the region greater than 500 Hz. Thus, receiving the emitted sound field from this speaker reads on "a distance from the apex positions of the adjacent two speakers having a maximum inclination characteristic in a relationship between the sound frequency of about 500Hz and greater and the sound pressure, without the correction filter".

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to include the speakers taught by Kito in the system of Glassco in view of Davis. The motivation behind

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such a modification would have been the improved frequency range that the speakers of Kito would have provided to the emitted sound field of the system of Glassco in view of Davis.

Regarding **Claim 8**, Figure 11 of Davis shows the frequency response of the speakers of the system without the inclusion of any frequency adjustments. The on-axis regions (42A-42F) of the speakers shown in Figure 11 read on "characteristics of the speakers are set to maintain the flatness of the sound pressures at a position outside each speaker along an axial line of each speaker without the correction filter" (col. 8, lines 37-57).

Regarding **Claim 9**, please refer to the like teachings of Claim 7. Regarding **Claim 10**, please refer to the like teachings of Claim 8.

Response to Arguments

Applicant's arguments with respect to claims 1-6 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In

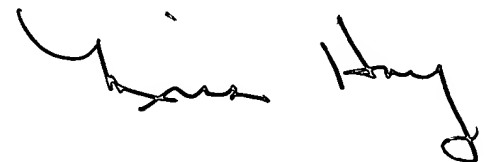
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the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Graham whose telephone number is (703) 308-6729. The examiner can normally be reached on Monday-Friday (7:30-4:30), excluding alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Isen, can be reached at (703) 305-4386. The fax number for the organization where this application or proceeding is assigned is 703-872-9314 for regular communications, and 703-872-9315 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.



Andrew Graham
Examiner
A.U. 2644

MINSUN OH HARVEY
PRIMARY EXAMINER